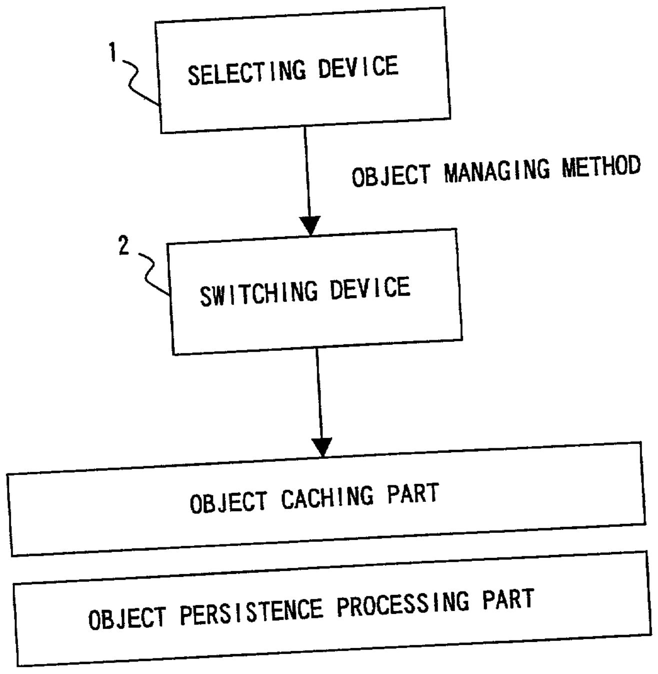
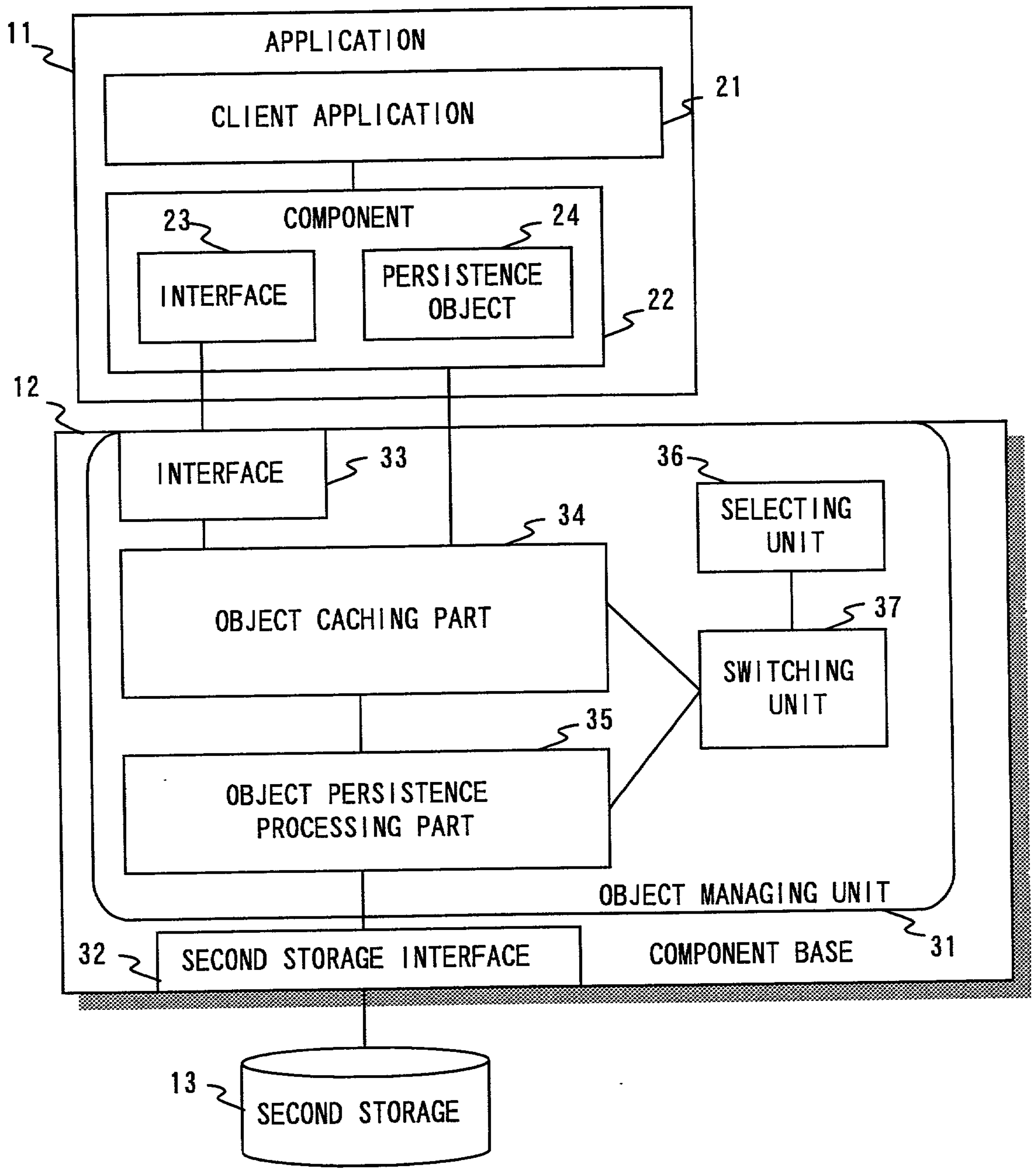
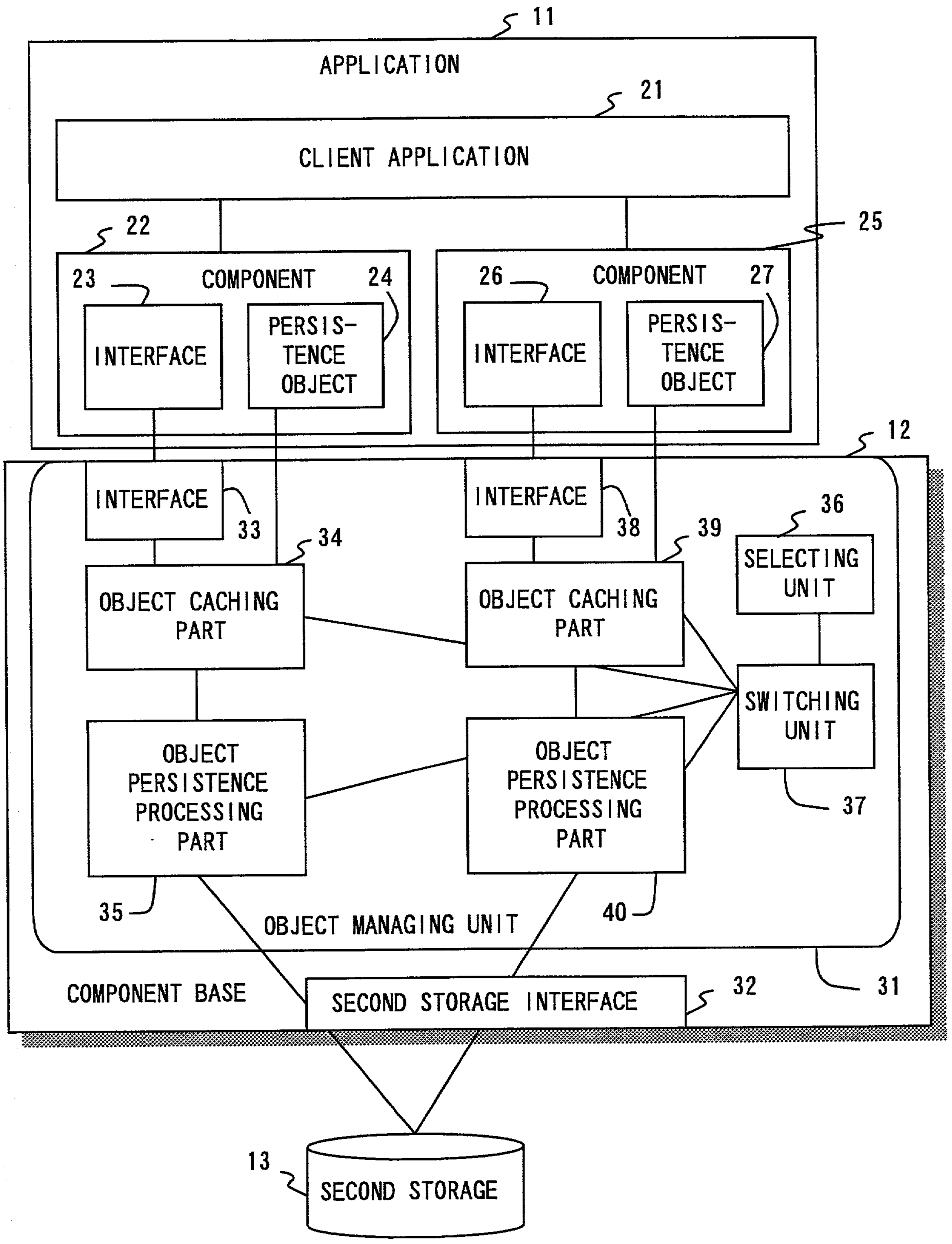

1
SELECTING DEVICE
OBJECT MANAGING METHOD
2
SWITCHING DEVICE
OBJECT CACHING PART
OBJECT PERSISTENCE PROCESSING PART

F I G. 1



11
APPLICATION
CLIENT APPLICATION
21
COMPONENT
23
24
INTERFACE
PERSISTENCE OBJECT
22
12
INTERFACE
33
36
SELECTING UNIT
34
OBJECT CACHING PART
37
SWITCHING UNIT
35
OBJECT PERSISTENCE PROCESSING PART
OBJECT MANAGING UNIT
31
32
SECOND STORAGE INTERFACE
COMPONENT BASE
13
SECOND STORAGE

F I G. 2



11
APPLICATION
21
CLIENT APPLICATION
22
25
23
COMPONENT
24
26
COMPONENT
27
INTERFACE
PERSIS-TENCE OBJECT
INTERFACE
PERSIS-TENCE OBJECT
12
INTERFACE
33
34
INTERFACE
38
39
36
SELECTING UNIT
OBJECT CACHING PART
OBJECT CACHING PART
SWITCHING UNIT
OBJECT PERSISTENCE PROCESSING PART
OBJECT PERSISTENCE PROCESSING PART
37
35
OBJECT MANAGING UNIT
40
COMPONENT BASE
SECOND STORAGE INTERFACE
32
31
13
SECOND STORAGE

FIG. 3

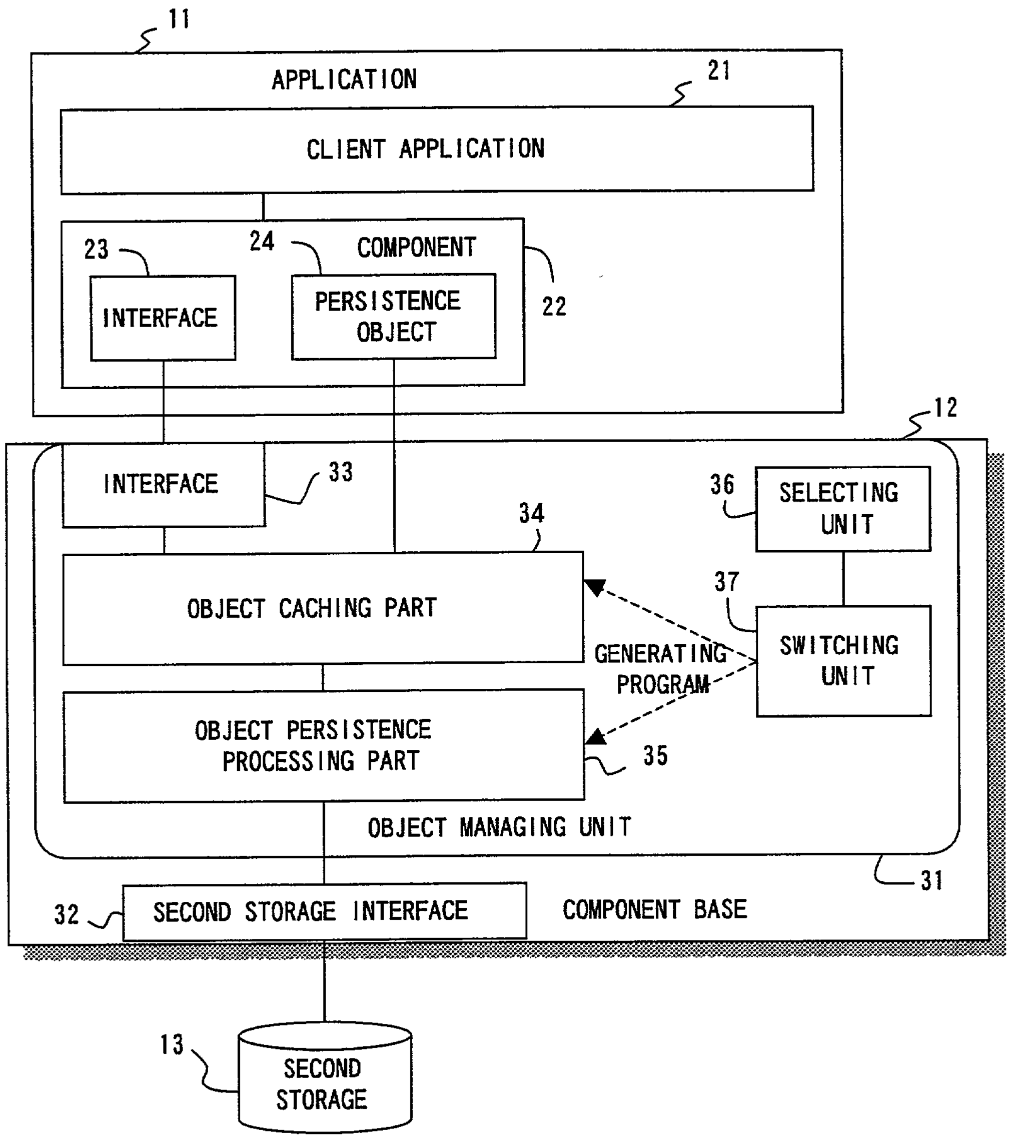
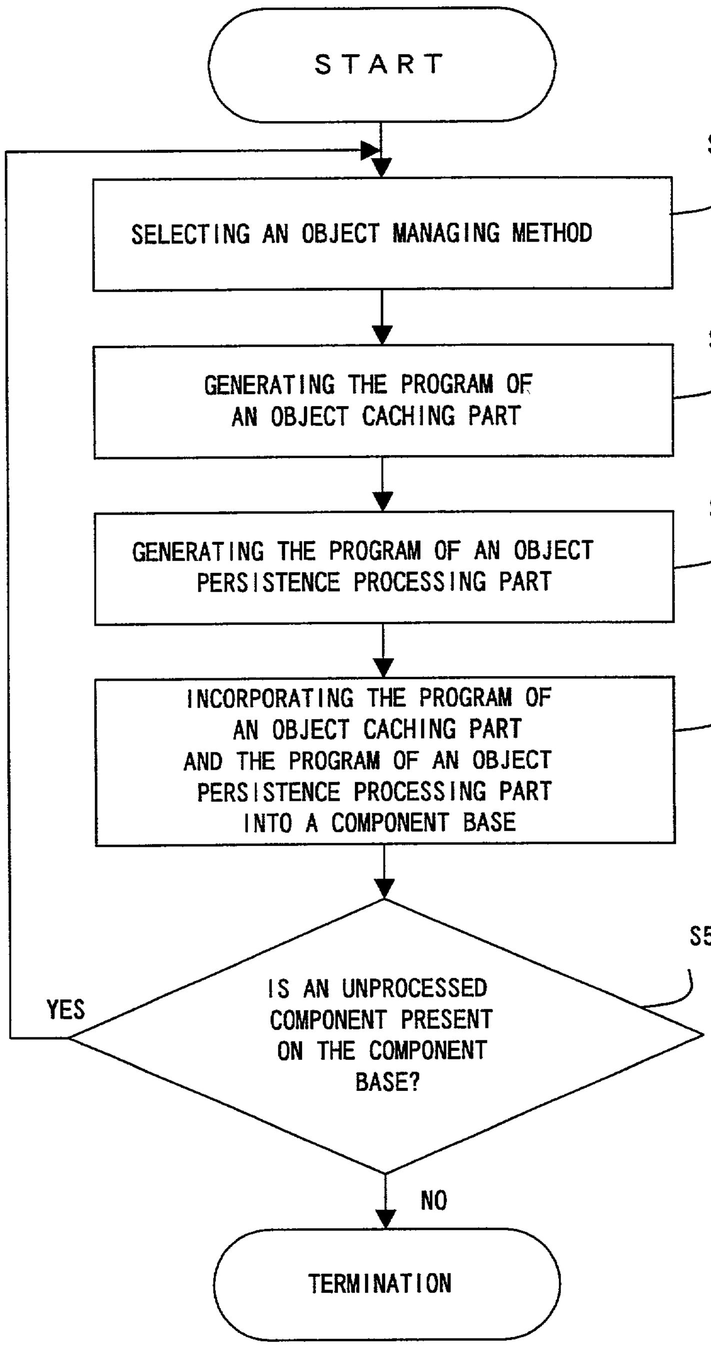

11
APPLICATION
21
CLIENT APPLICATION
23
24
COMPONENT
INTERFACE
PERSISTENCE OBJECT
22
12
INTERFACE
33
36
SELECTING UNIT
34
OBJECT CACHING PART
37
GENERATING PROGRAM
SWITCHING UNIT
OBJECT PERSISTENCE PROCESSING PART
35
OBJECT MANAGING UNIT
31
32
SECOND STORAGE INTERFACE
COMPONENT BASE
13
SECOND STORAGE

FIG. 4


START
S1
SELECTING AN OBJECT MANAGING METHOD
S2
GENERATING THE PROGRAM OF AN OBJECT CACHING PART
S3
GENERATING THE PROGRAM OF AN OBJECT PERSISTENCE PROCESSING PART
S4
INCORPORATING THE PROGRAM OF AN OBJECT CACHING PART AND THE PROGRAM OF AN OBJECT PERSISTENCE PROCESSING PART INTO A COMPONENT BASE
S5
IS AN UNPROCESSED COMPONENT PRESENT ON THE COMPONENT BASE?
YES
NO
TERMINATION

F I G. 5

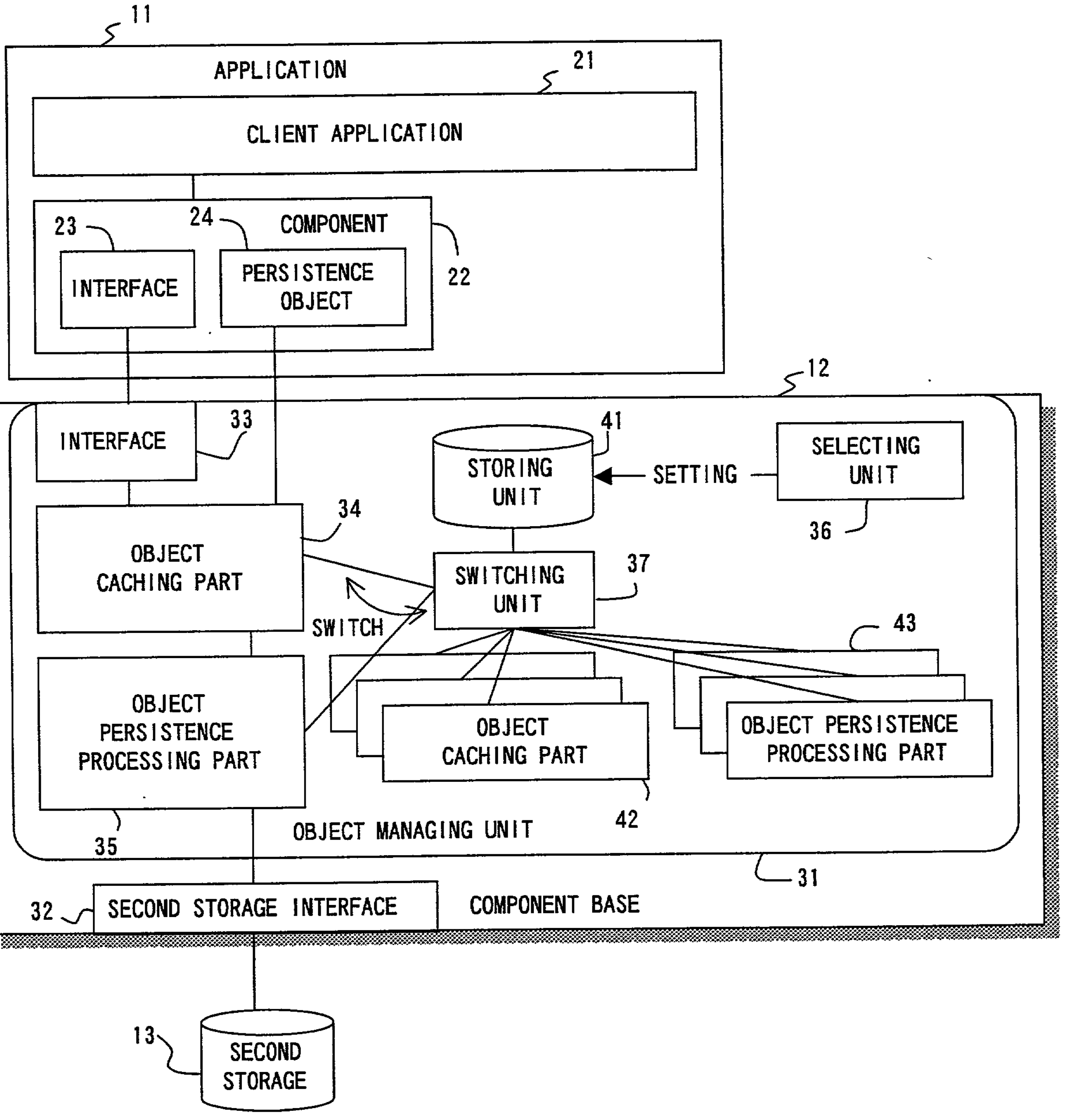
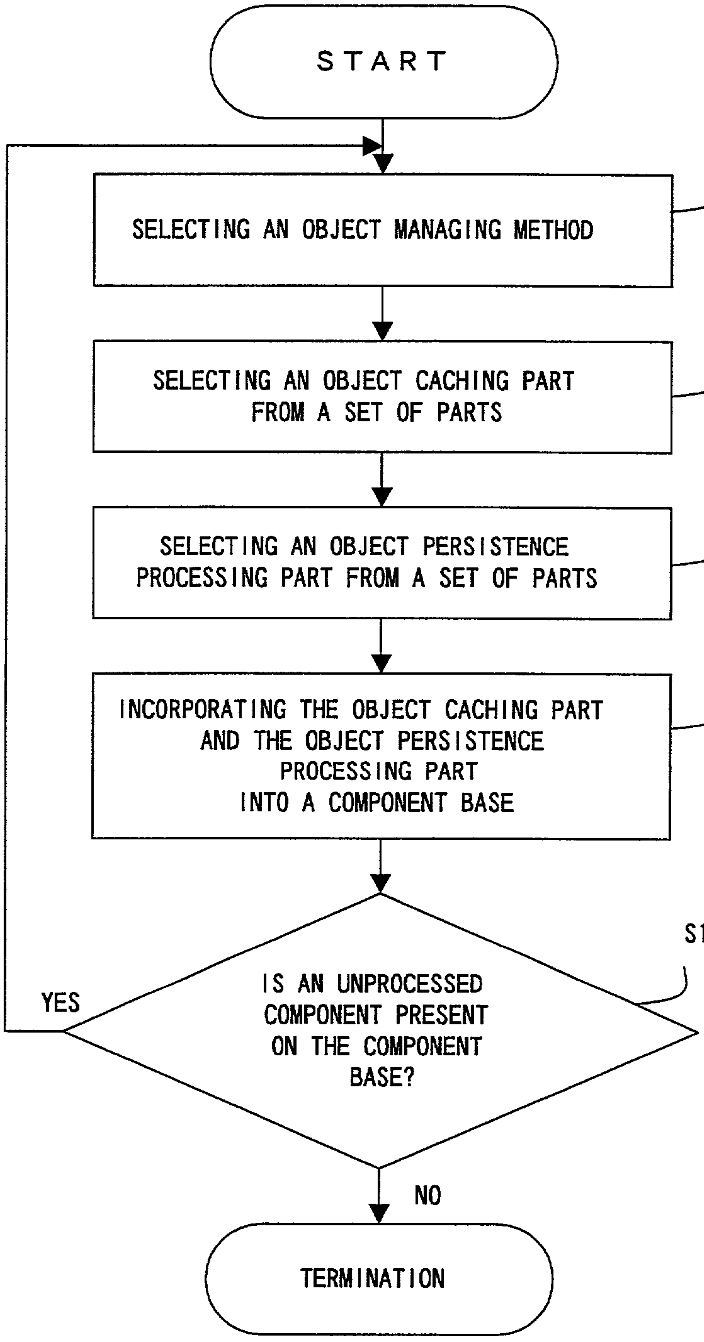
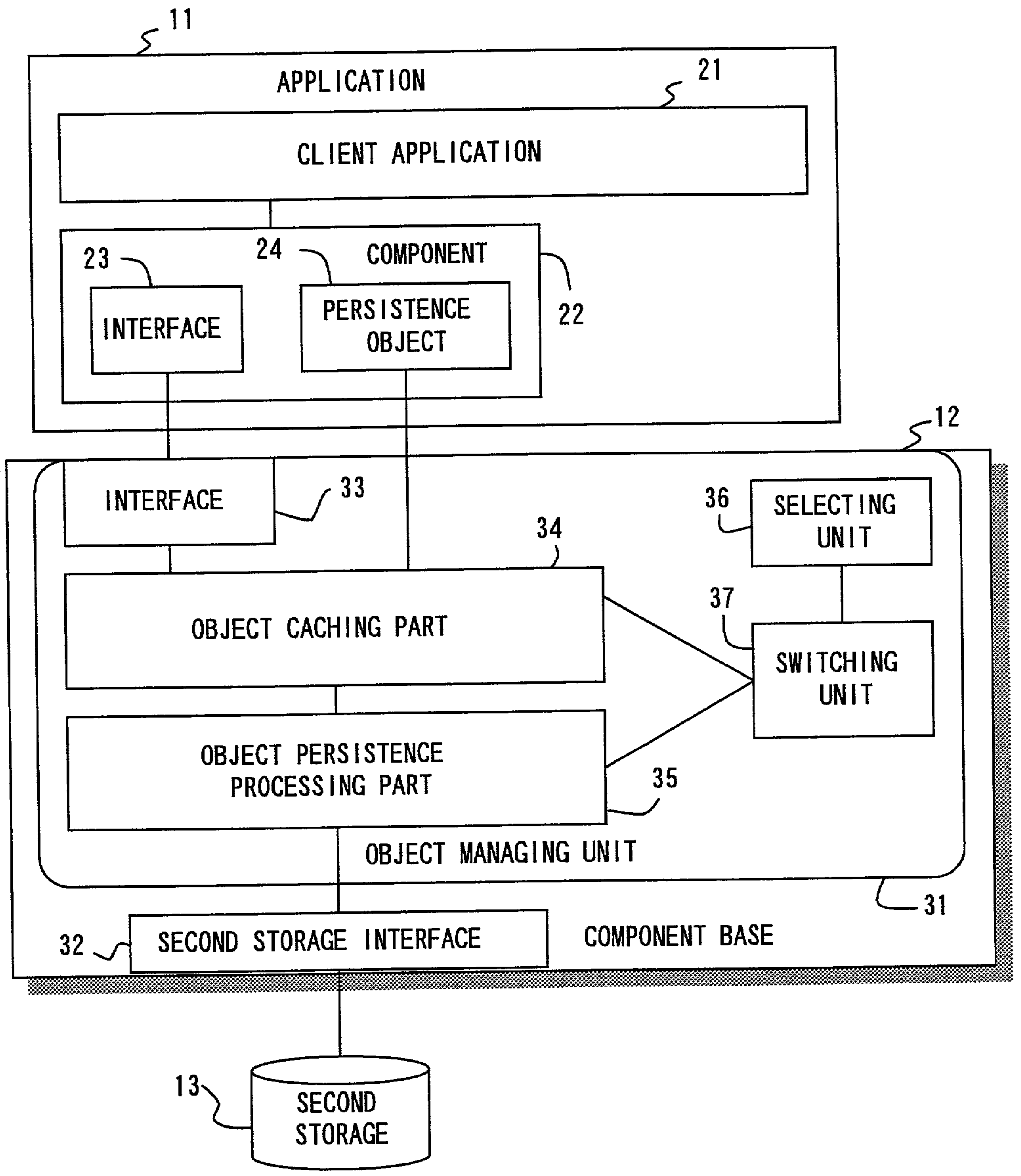

11
APPLICATION
21
CLIENT APPLICATION
23
24
COMPONENT
INTERFACE
PERSISTENCE OBJECT
22
12
INTERFACE
33
41
STORING UNIT
SETTING
SELECTING UNIT
36
34
OBJECT CACHING PART
SWITCHING UNIT
37
SWITCH
43
OBJECT PERSISTENCE PROCESSING PART
OBJECT CACHING PART
OBJECT PERSISTENCE PROCESSING PART
35
OBJECT MANAGING UNIT
42
31
32
SECOND STORAGE INTERFACE
COMPONENT BASE
13
SECOND STORAGE

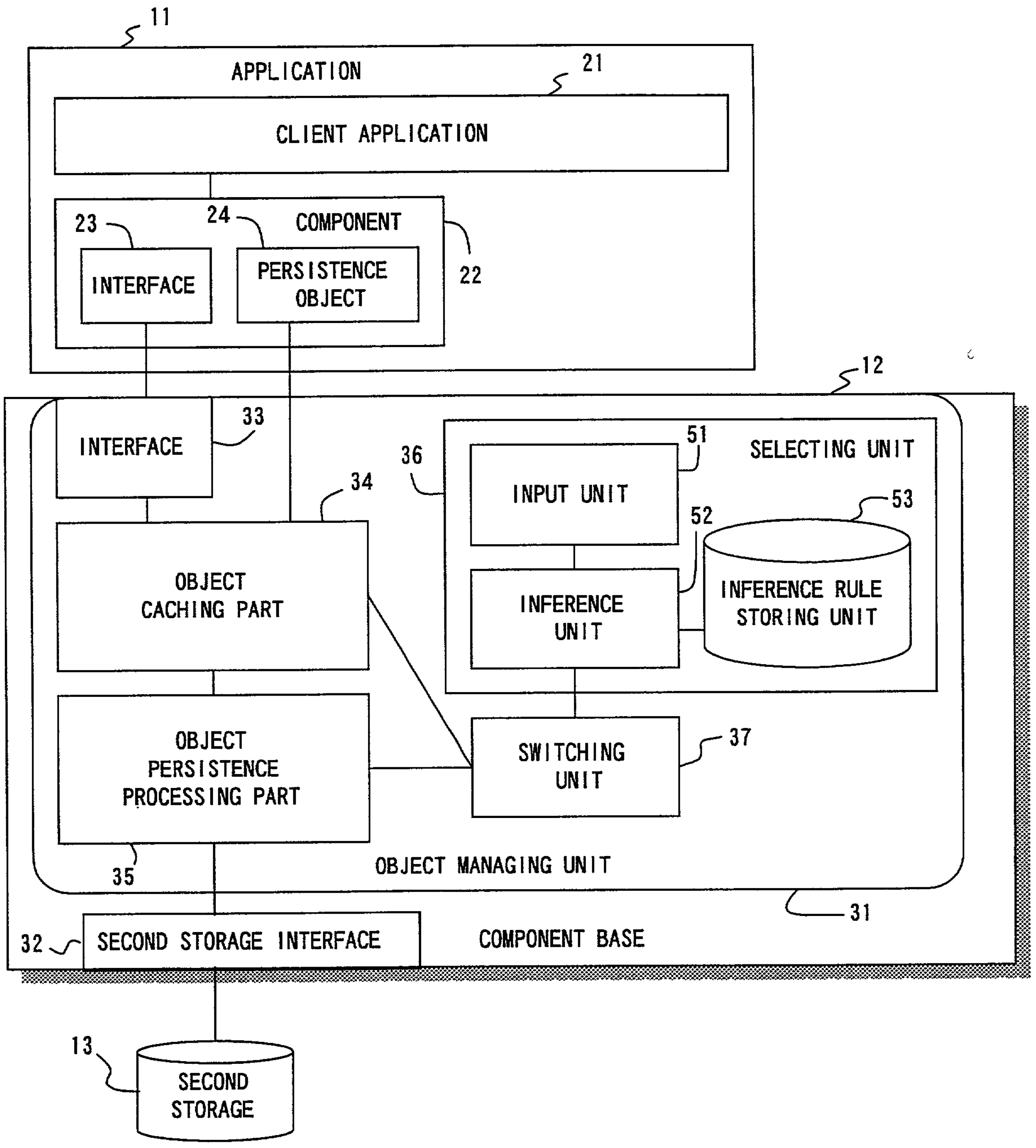
FIG. 6


START
SELECTING AN OBJECT MANAGING METHOD
S11
SELECTING AN OBJECT CACHING PART FROM A SET OF PARTS
S12
SELECTING AN OBJECT PERSISTENCE PROCESSING PART FROM A SET OF PARTS
S13
INCORPORATING THE OBJECT CACHING PART AND THE OBJECT PERSISTENCE PROCESSING PART INTO A COMPONENT BASE
S14
IS AN UNPROCESSED COMPONENT PRESENT ON THE COMPONENT BASE?
S15
YES
NO
TERMINATION

F I G. 7


11
APPLICATION
21
CLIENT APPLICATION
23
24
COMPONENT
INTERFACE
PERSISTENCE OBJECT
22
12
INTERFACE
33
36
SELECTING UNIT
34
37
OBJECT CACHING PART
SWITCHING UNIT
OBJECT PERSISTENCE PROCESSING PART
35
OBJECT MANAGING UNIT
31
32
SECOND STORAGE INTERFACE
COMPONENT BASE
13
SECOND STORAGE

F I G. 8



11
APPLICATION
21
CLIENT APPLICATION
23
24
COMPONENT
22
INTERFACE
PERSISTENCE OBJECT
12
INTERFACE
33
36
51
SELECTING UNIT
INPUT UNIT
34
52
53
OBJECT CACHING PART
INFERENCE UNIT
INFERENCE RULE STORING UNIT
OBJECT PERSISTENCE PROCESSING PART
SWITCHING UNIT
37
35
OBJECT MANAGING UNIT
31
32
SECOND STORAGE INTERFACE
COMPONENT BASE
13
SECOND STORAGE

FIG. 9

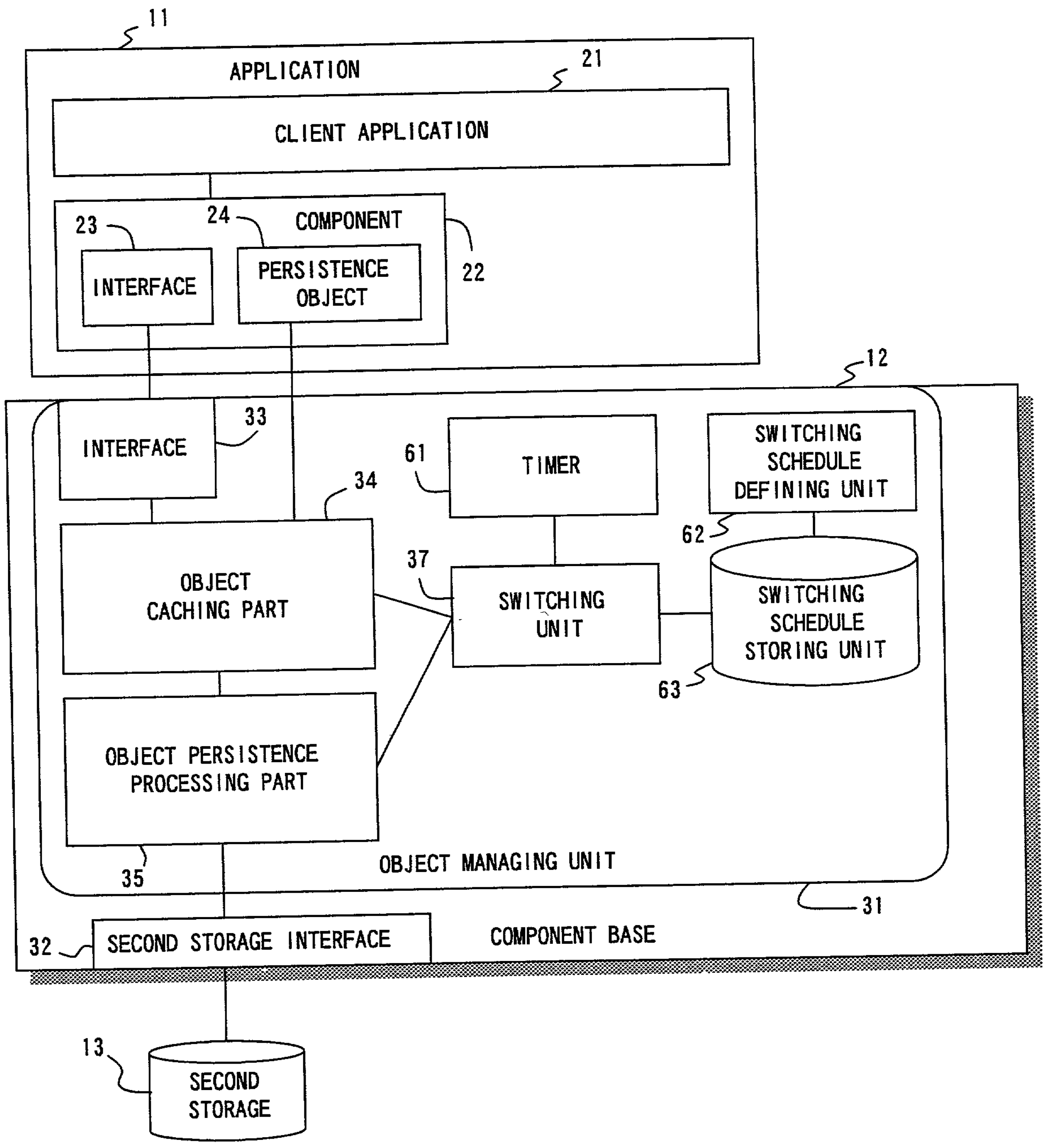
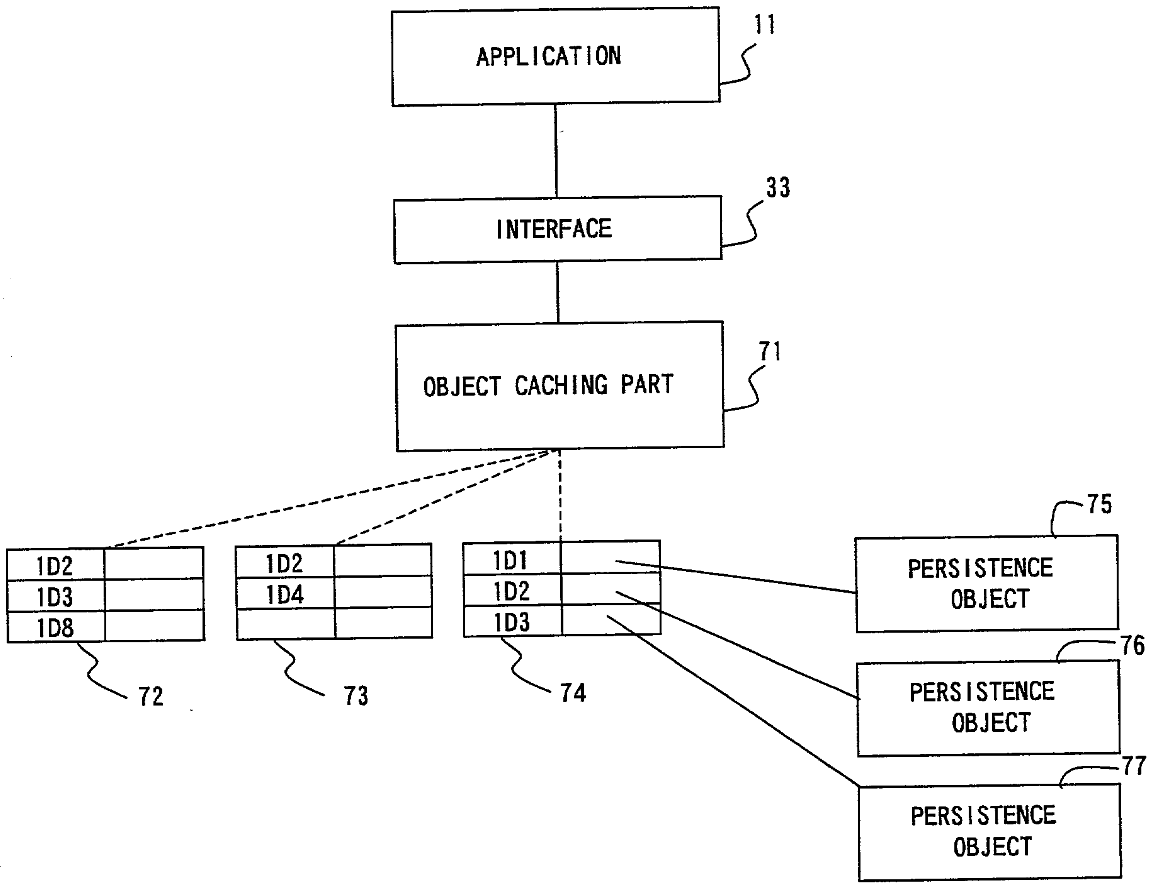

11
APPLICATION
21
CLIENT APPLICATION
23
24
COMPONENT
22
INTERFACE
PERSISTENCE OBJECT
12
INTERFACE
33
61
TIMER
SWITCHING SCHEDULE DEFINING UNIT
34
62
37
OBJECT CACHING PART
SWITCHING UNIT
SWITCHING SCHEDULE STORING UNIT
63
OBJECT PERSISTENCE PROCESSING PART
35
OBJECT MANAGING UNIT
31
32
SECOND STORAGE INTERFACE
COMPONENT BASE
13
SECOND STORAGE

FIG. 10



APPLICATION
11
INTERFACE
33
OBJECT CACHING PART
71
1D2
1D3
1D8
72
1D2
1D4
73
1D1
1D2
1D3
74
PERSISTENCE OBJECT
75
PERSISTENCE OBJECT
76
PERSISTENCE OBJECT
77

FIG. 11

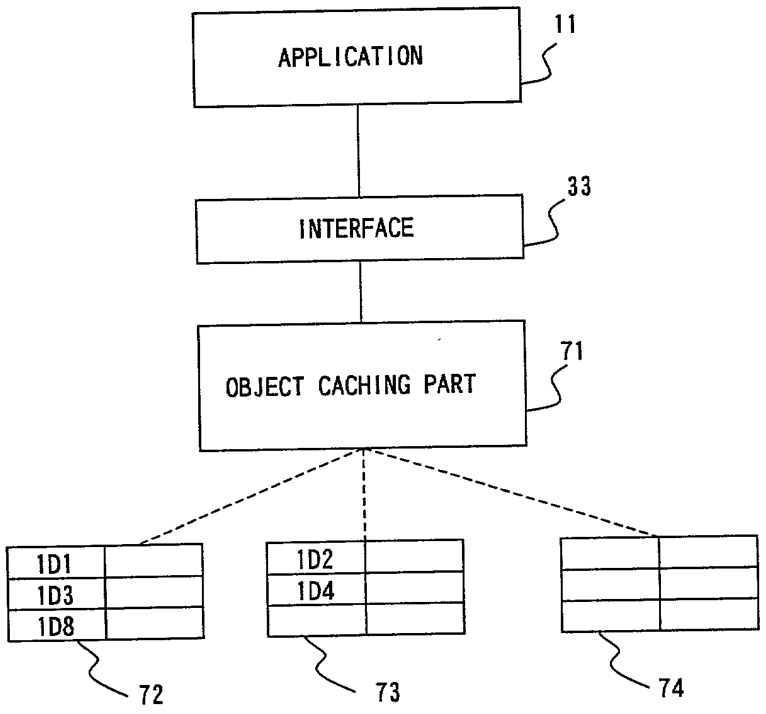

APPLICATION
11
INTERFACE
33
OBJECT CACHING PART
71
ID1
ID3
ID8
ID2
ID4
72
73
74

FIG. 12

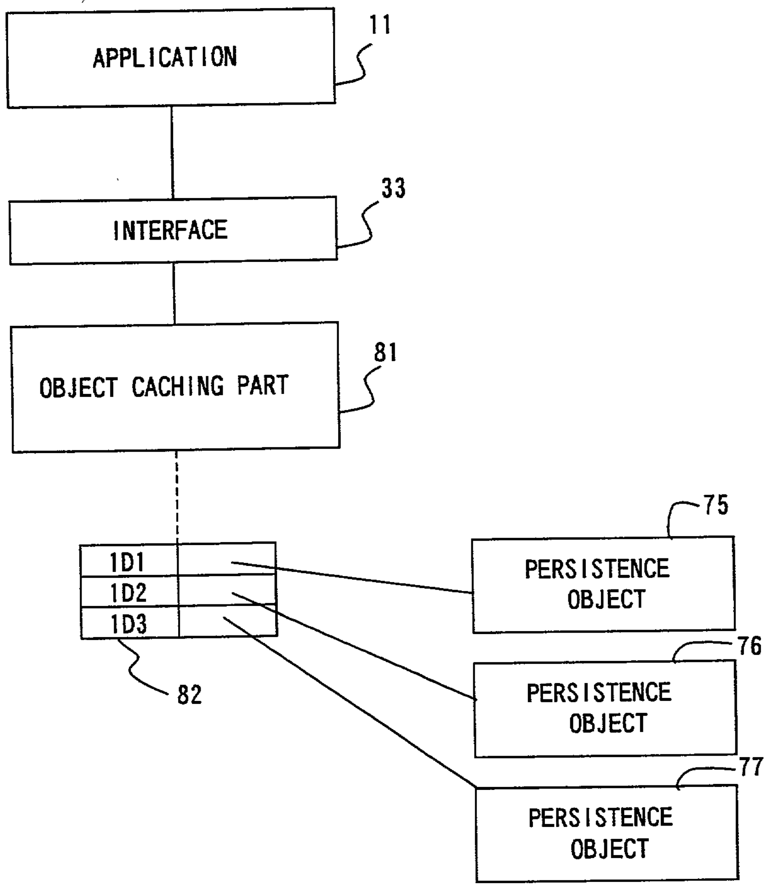
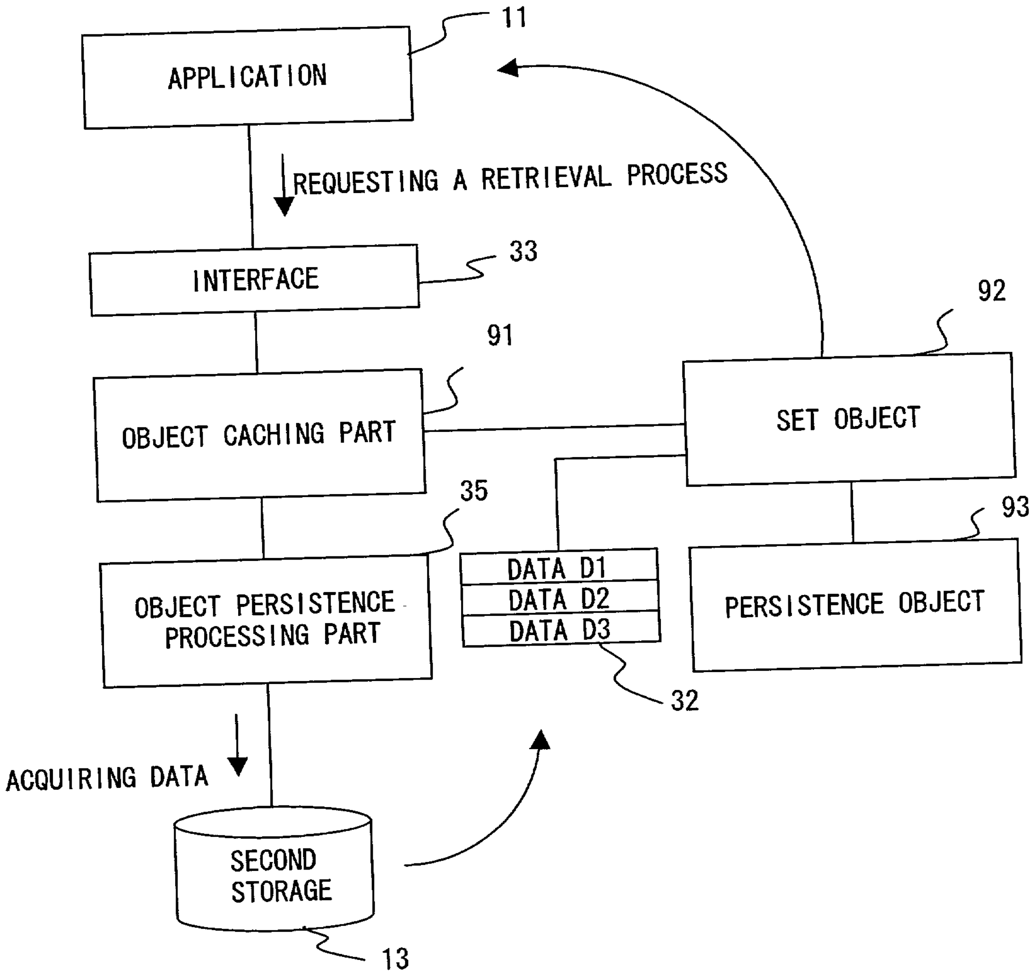
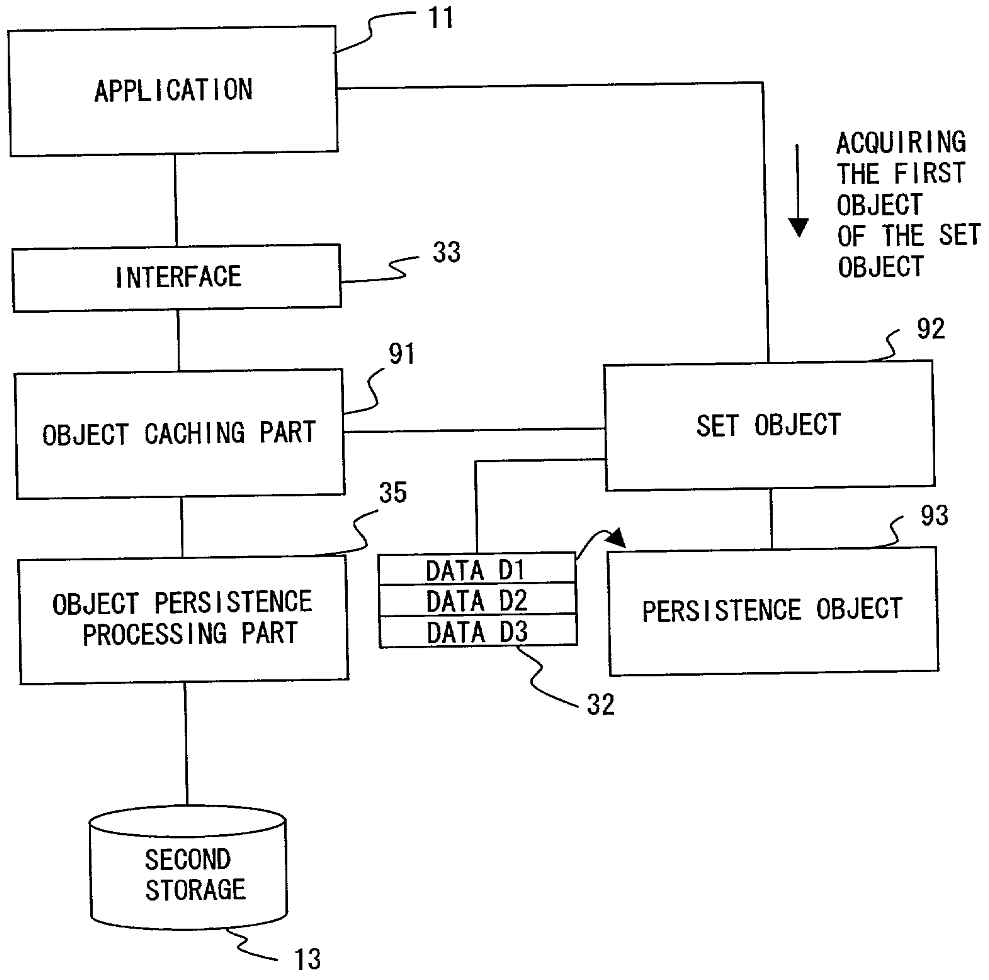

APPLICATION
11
INTERFACE
33
OBJECT CACHING PART
81
1D1
1D2
1D3
82
PERSISTENCE OBJECT
75
PERSISTENCE OBJECT
76
PERSISTENCE OBJECT
77

FIG. 13



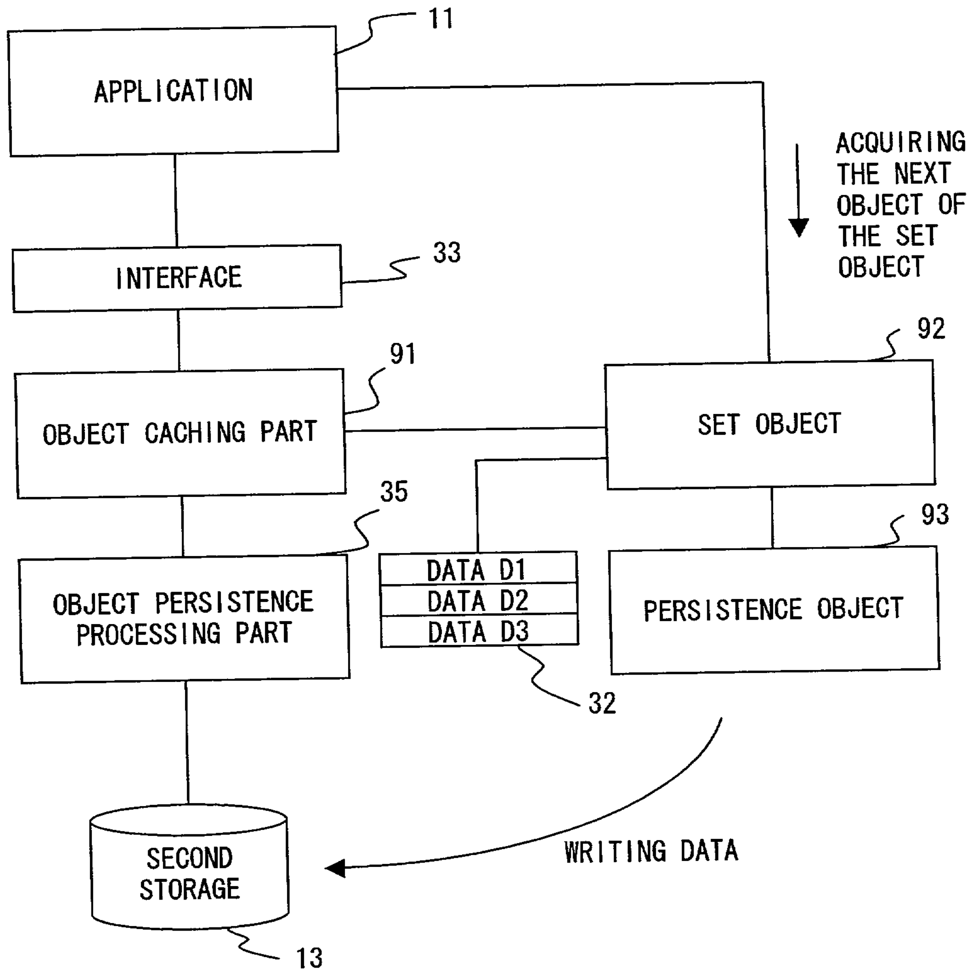
11
APPLICATION
REQUESTING A RETRIEVAL PROCESS
INTERFACE
33
92
91
OBJECT CACHING PART
SET OBJECT
35
93
OBJECT PERSISTENCE PROCESSING PART
DATA D1
DATA D2
DATA D3
PERSISTENCE OBJECT
32
ACQUIRING DATA
SECOND STORAGE
13

FIG. 14



11
APPLICATION
ACQUIRING THE FIRST OBJECT OF THE SET OBJECT
INTERFACE
33
91
92
OBJECT CACHING PART
SET OBJECT
35
93
DATA D1
DATA D2
DATA D3
OBJECT PERSISTENCE PROCESSING PART
PERSISTENCE OBJECT
32
SECOND STORAGE
13

FIG. 15



11
APPLICATION
ACQUIRING THE NEXT OBJECT OF THE SET OBJECT
INTERFACE
33
91
OBJECT CACHING PART
92
SET OBJECT
35
93
OBJECT PERSISTENCE PROCESSING PART
DATA D1
DATA D2
DATA D3
PERSISTENCE OBJECT
32
SECOND STORAGE
WRITING DATA
13

FIG. 16

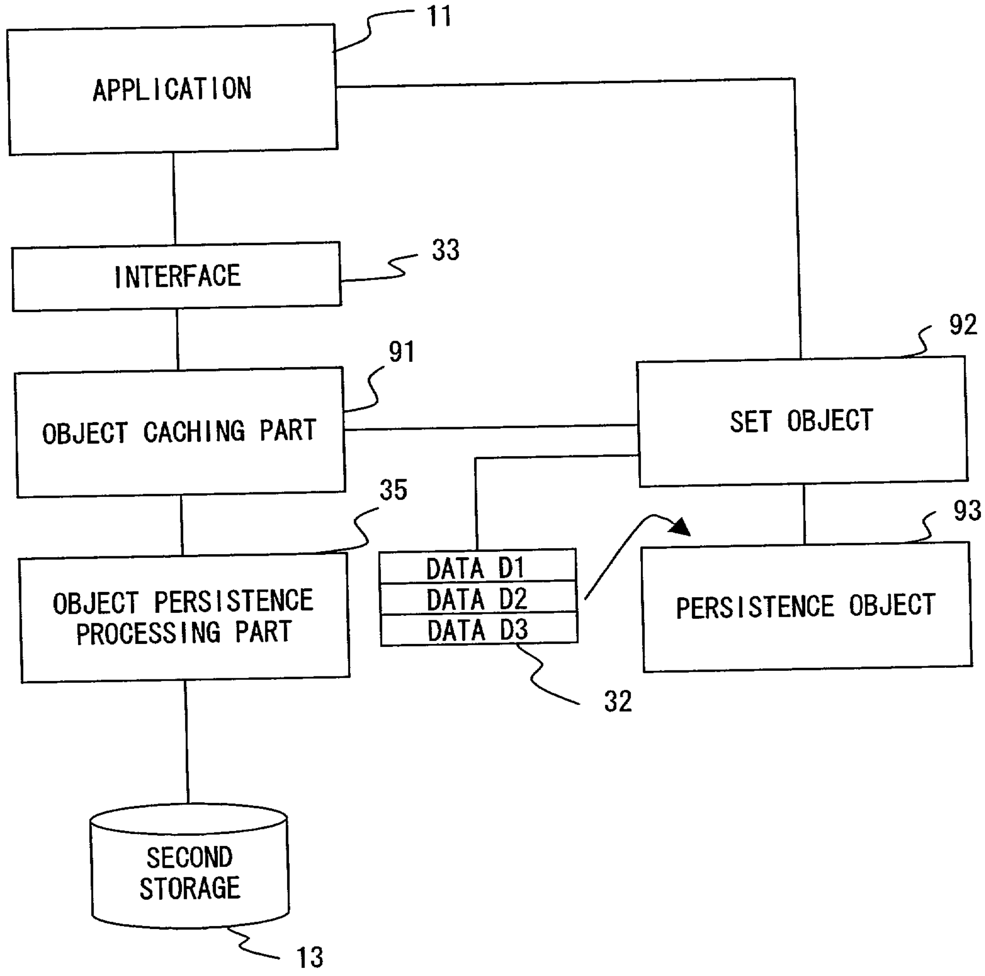

11
APPLICATION
33
INTERFACE
92
91
OBJECT CACHING PART
SET OBJECT
35
93
OBJECT PERSISTENCE PROCESSING PART
DATA D1
DATA D2
DATA D3
PERSISTENCE OBJECT
32
SECOND STORAGE
13

FIG. 17

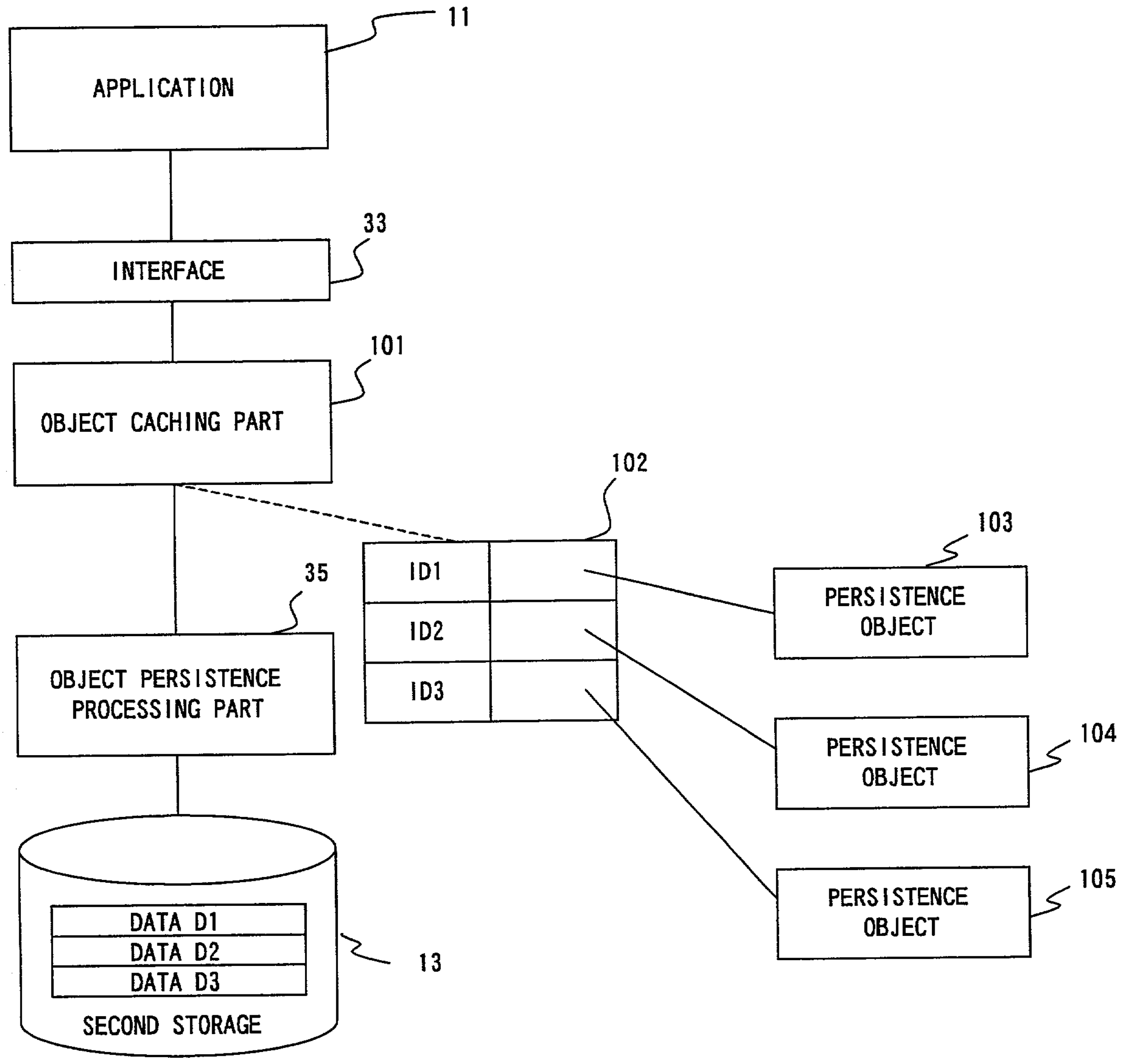
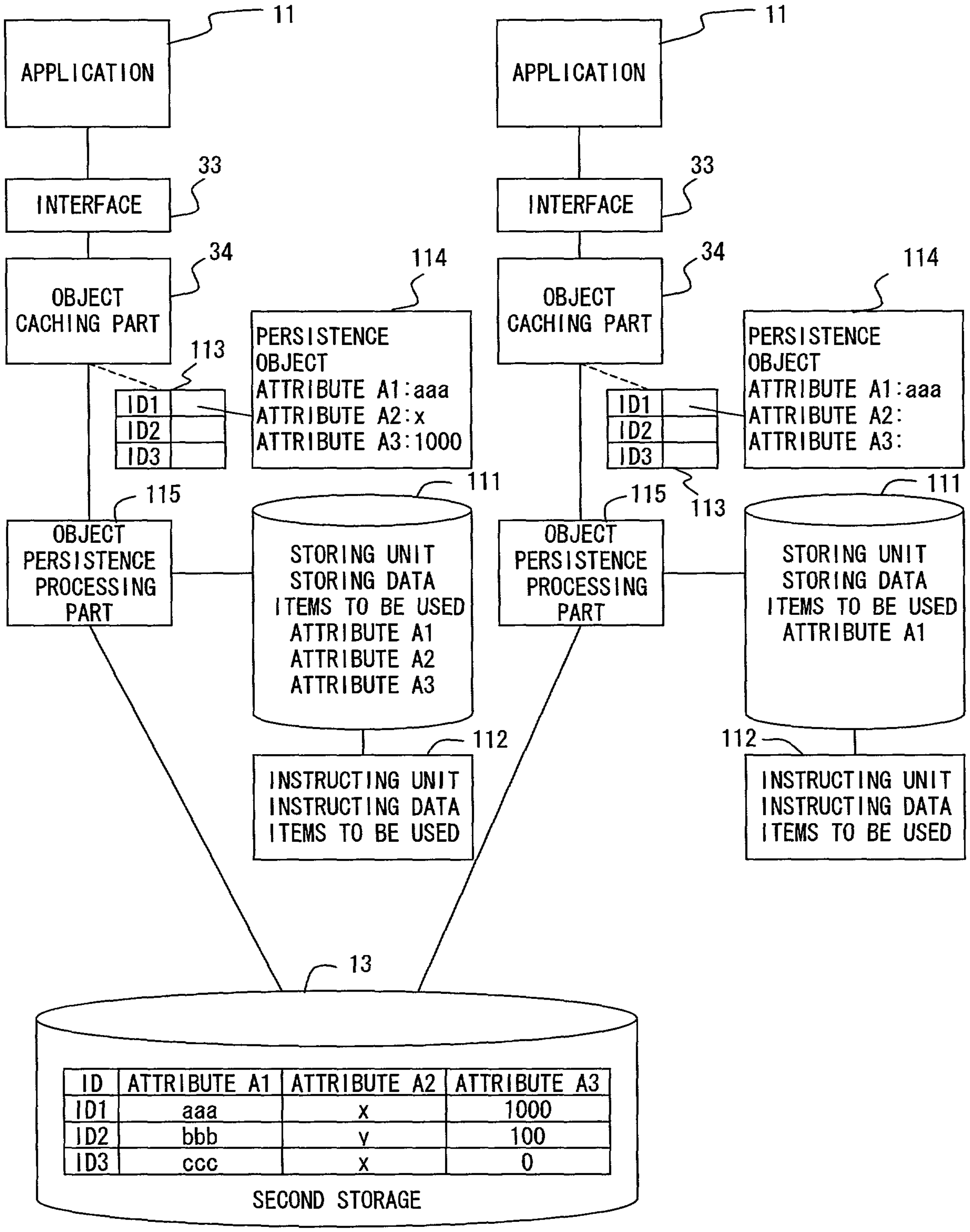

APPLICATION
11
INTERFACE
33
OBJECT CACHING PART
101
102
ID1
ID2
ID3
103
PERSISTENCE OBJECT
35
OBJECT PERSISTENCE PROCESSING PART
PERSISTENCE OBJECT
104
PERSISTENCE OBJECT
105
DATA D1
DATA D2
DATA D3
13
SECOND STORAGE

FIG. 18



ID	ATTRIBUTE A1	ATTRIBUTE A2	ATTRIBUTE A3
ID1	aaa	x	1000
ID2	bbb	y	100
ID3	ccc	x	0

F I G. 1 9

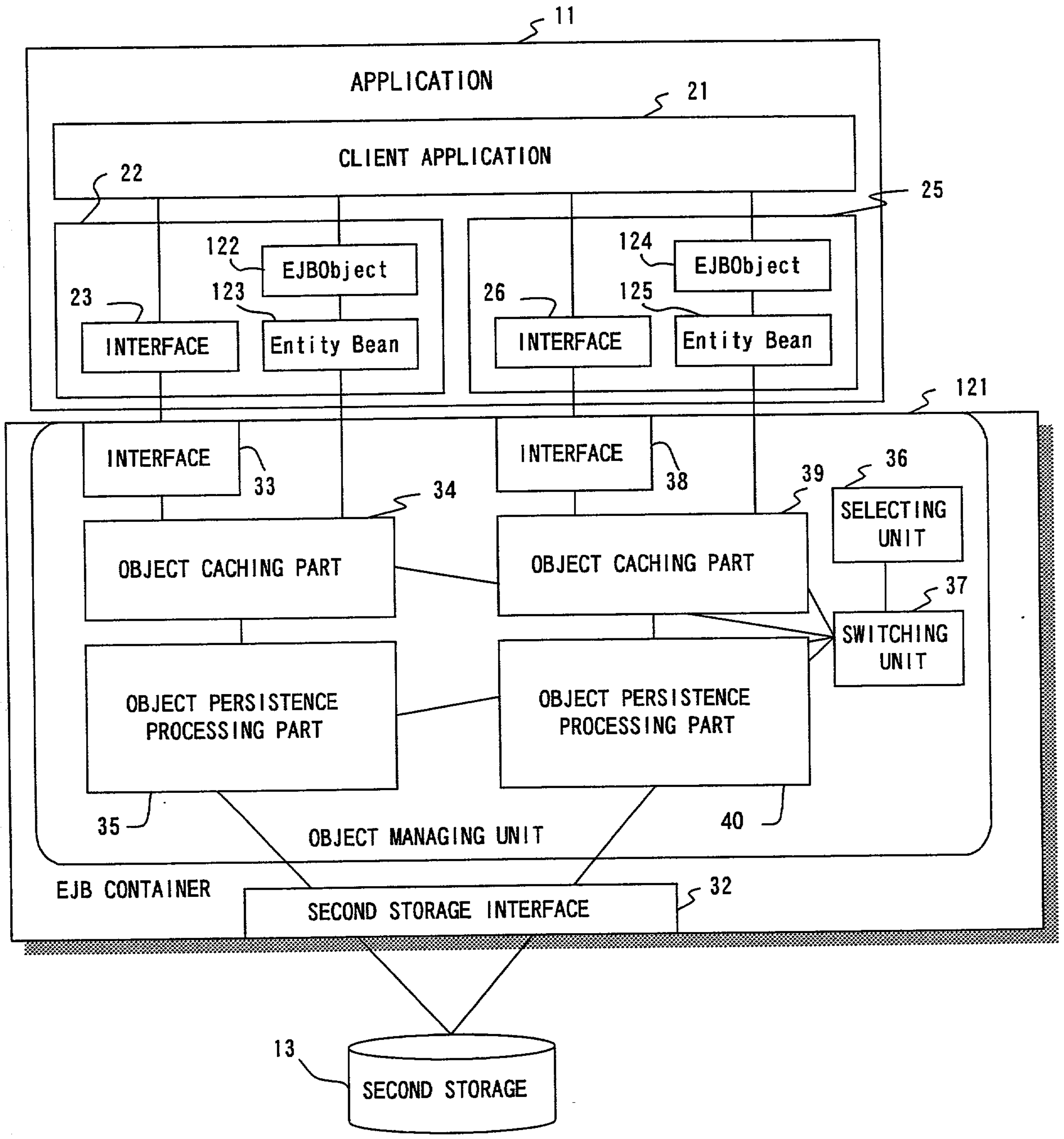


FIG. 20

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```
public class $$Bean$$Cache
{
     Hashtable cacheTableHash;
     $$Bean$$Persistence objPersistence;

     $$Bean$$ findByPrimaryKey($$PrimaryKey$$ pk)
     {
          String transactionID = getTransactionID();
          Hashtable cacheTable = (Hashtable)cacheTableHash.get(transactionID);
          $$Bean$$ bean = cacheTable.get(pk);

          if (bean != null) return bean;

          bean = objPersistence.findBean(pk);
          cacheTable.put(pk,bean);
          return bean;
     }
     ....

}
```

FIG. 21

```
public class $$Bean$$Persistence
{
    DataSource dataSource;

    $$Bean$$ findBean($$PrimaryKey$$ pk)
    {
        $$Bean$$ bean = null;
        Connection connection = getConnection();
        String sql = "SELECT $$BeanFieldColumns$$ FROM $$Table$$ WHERE
            $$PKFieldColumns$$ = ?";
        Statement statement = connection.preparedStatement(sql);

        //$$ foreach $$PKFields$$
        statement.set$$Type$$($$Count$$,pk.$$Name$$);
        //$$ end foreach

        ResultSet rs = statement.executeQuery();
        while(rs.next())
        {
            bean = new $$Bean$$();
            //$$ foreach $$BeanFields$$
            bean.$$Name$$ = rs.get$$Type$$($$Count$$);
            //$$ end foreach

        }
        return bean;
    }
    ....
```

FIG. 22

```
public class OrderBeanCache
{
      Hashtable cacheTableHash;
      OrderBeanPersistence objPersistence;

      OrderBean findByPrimaryKey(OrderBeanPrimaryKey pk)
      {
            String transactionID = getTransactionID();
            Hashtable cacheTable = (Hashtable)cacheTableHash.get(transactionID);
            OrderBean bean = cacheTable.get(pk);

            if (bean != null) return bean;

            bean = objPersistence.findBean(pk);
            cacheTable.put(pk,bean);
            return bean;
      }
      ....
}
```

FIG. 23

```
public class OrderBeanPersistence
{
     DataSource dataSource;

     OrderBean findBean(OrderBeanPrimaryKey pk)
     {
          OrderBean bean = null;
          Connection connection = getConnection();
          String sql = "SELECT ID,PRODUCT,QUANTITY FROM ORDERTABLE
WHERE ID = ?";
          Statement statement = connection.preparedStatement(sql);

          statement.setString(1,pk.id);
          statement.setString(2,pk.product);
          statement.setInt(3,pk.quantity);

          ResultSet rs = statement.executeQuery();
          while(rs.next())
          {
               bean = new OrderBean();
               bean.id = rs.getString(1);
               bean.product = rs.getString(2);
               bean.quantity = rs.getInt(3);

          }
          return bean;
     }
....

}
```

FIG. 24

```
public class ObjectCacheOption1 extends ObjectCache
{
      Hashtable cacheTableHash;
      ObjectPersistence objPersistence;

      Object findByPrimaryKey(Object pk, BeanDef beanDef)
      {
            String transactionID = getTransactionID();
            Hashtable cacheTable = (Hashtable)cacheTableHash.get(transactionID);
            Object bean = cacheTable.get(pk);

            if (bean != null) return bean;

            bean = objPersistence.findBean(pk,beanDef,"findByPrimaryKey");
            cacheTable.put(pk,bean);
            return bean;
      }
      ....

}
```

FIG. 25

```
public class ObjectPersistenceOption1 extends ObjectPersistence
{
    DataSource dataSource;

    Object findBean(Object pk, BeanDef beanDef, String finderName)
    {
        Object bean = null;
        Connection connection = getConnection();
        String sql = beanDef.getSQL(finderName);
        Statement statement = connection.preparedStatement(sql);

        Enumeration fields = beanDef.getFields();
        while (fields.hasMoreElements())
        {
            FieldDef field = (FieldDef)fields.nextElement();
            setValue(statement,field);
            }

            ResultSet rs = statement.executeQuery();
            while(rs.next())
            {
                bean = beanDef.newInstance();
                fields = beanDef.getFields();
                while (fields.hasMoreElements())
                {
                    FieldDef field = (FieldDef)fields.nextElement();
                    setValue(bean,rs,field);
                }
            }
        }
        return bean;
    }
    ...

    void setValue(Object bean, ResultSet, FieldDef field)
    {
        Field f = field.getField();
        switch (field.fieldType)
        {
            case FT_INT:
                f.setInt(bean,rs.getInt(field.getColumn()));
                break;
            case FT_LONG:
                f.setLong(bean,rs.getLong(field.getColumn()));
                break;
            ...
        }
    }
    ...

}
```

FIG. 26

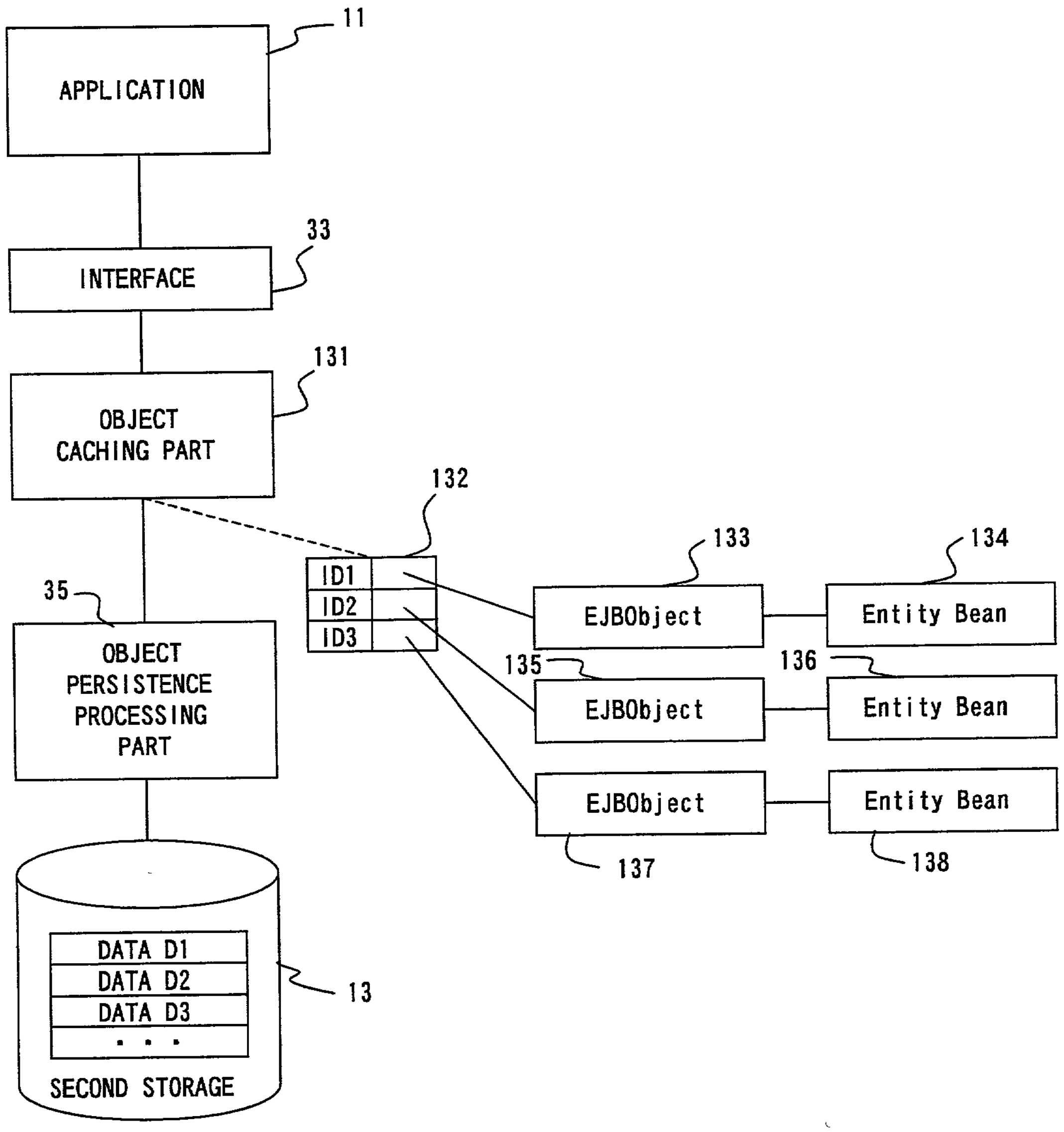

11
APPLICATION
33
INTERFACE
131
OBJECT CACHING PART
132
ID1
ID2
ID3
133
134
EJBObject
Entity Bean
135
136
EJBObject
Entity Bean
EJBObject
Entity Bean
137
138
35
OBJECT PERSISTENCE PROCESSING PART
DATA D1
DATA D2
DATA D3
・・・
SECOND STORAGE
13

FIG. 27

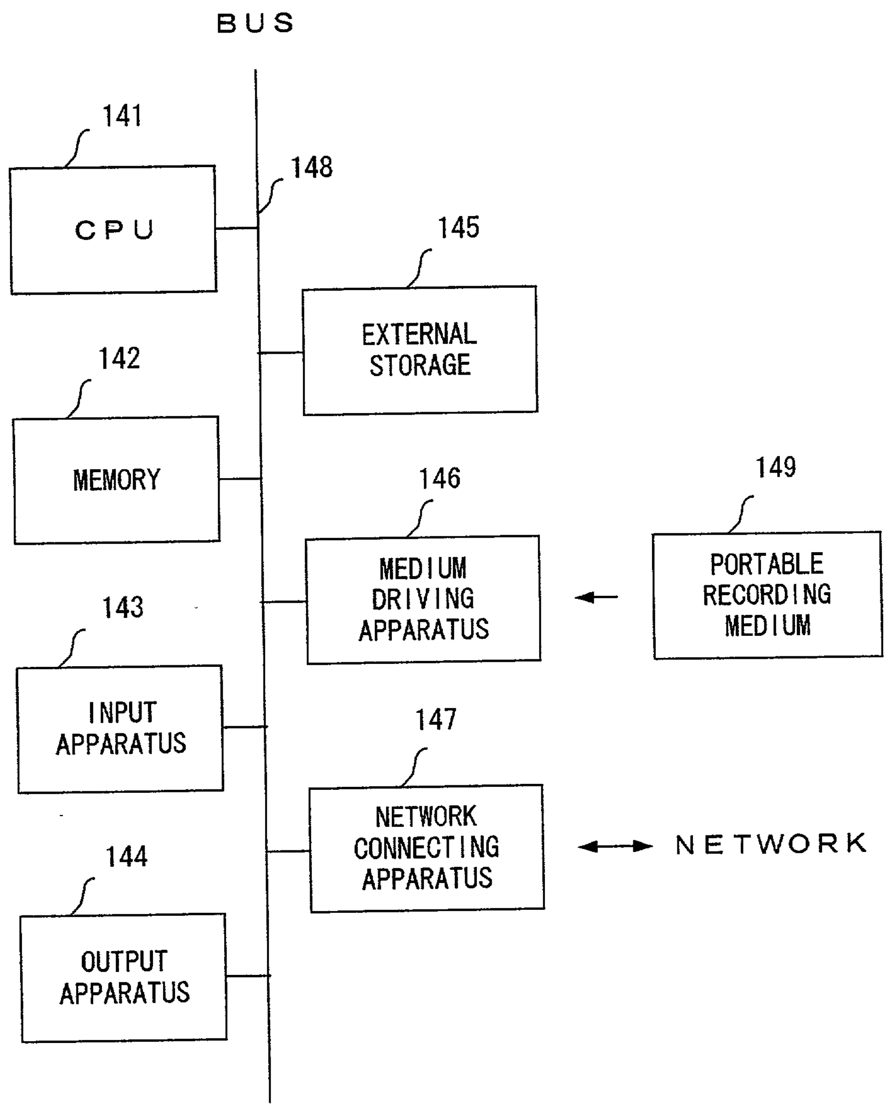
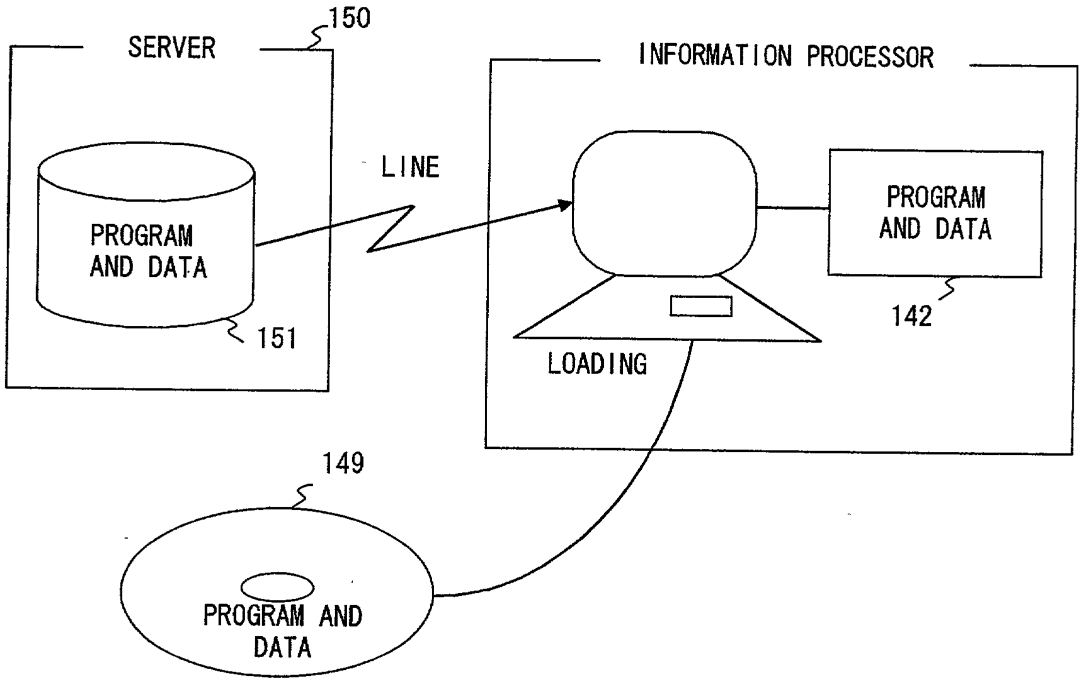

BUS
141
CPU
148
145
EXTERNAL STORAGE
142
MEMORY
146
MEDIUM DRIVING APPARATUS
149
PORTABLE RECORDING MEDIUM
143
INPUT APPARATUS
147
NETWORK CONNECTING APPARATUS
NETWORK
144
OUTPUT APPARATUS

FIG. 28



SERVER
150
PROGRAM AND DATA
151
LINE
INFORMATION PROCESSOR
PROGRAM AND DATA
142
LOADING
149
PROGRAM AND DATA

FIG. 29